All India Test Series (2023-24)

Test Code: ANY/02 | **AITS TEST - 02** | **YAKEEN NEET**

DURATION: 200 Minutes | **DATE: 24/12/2023** | **M. MARKS: 720**

ANSWER KEY

(PHYSICS)

SECTION-A

1.	(3)	8.	(1)	15.	(4)	22.	(2)	29.	(4)
2.	(3)	9.	(2)	16.	(4)	23.	(4)	30.	(2)
3.	(1)	10.	(1)	17.	(1)	24.	(1)	31.	(1)
4.	(4)	11.	(1)	18.	(2)	25.	(2)	32.	(2)
5.	(3)	12.	(2)	19.	(1)	26.	(4)	33.	(1)
6.	(3)	13.	(3)	20.	(3)	27.	(1)	34.	(1)
7.	(3)	14.	(4)	21.	(2)	28.	(3)	35.	(4)

SECTION-B

36.	(4)	39.	(3)	42.	(4)	45.	(4)	48.	(1)
37.	(4)	40.	(4)	43.	(3)	46.	(1)	49.	(2)
38.	(1)	41.	(3)	44.	(1)	47.	(4)	50.	(1)

(CHEMISTRY)

SECTION-A

51.	(2)	58.	(4)	65.	(1)	72.	(1)	79.	(2)
52.	(3)	59.	(1)	66.	(3)	73.	(1)	80.	(1)
53.	(2)	60.	(2)	67.	(4)	74.	(2)	81.	(1)
54.	(4)	61.	(4)	68.	(2)	75.	(4)	82.	(3)
55.	(1)	62.	(4)	69.	(2)	76.	(3)	83.	(2)
56.	(2)	63.	(1)	70.	(1)	77.	(1)	84.	(3)
57.	(3)	64.	(2)	71.	(4)	78.	(1)	85.	(1)

SECTION-B

86.	(2)	89.	(2)	92.	(2)	95.	(3)	98.	(3)
87.	(2)	90.	(1)	93.	(2)	96.	(3)	99.	(3)
88.	(2)	91.	(1)	94.	(3)	97.	(1)	100.	(2)

(BOTANY)

SECTION-A

101.	(2)	108.	(1)	115.	(4)	122.	(1)	129.	(2)
102.	(4)	109.	(3)	116.	(2)	123.	(2)	130.	(1)
103.	(4)	110.	(2)	117.	(1)	124.	(4)	131.	(4)
104.	(1)	111.	(2)	118.	(2)	125.	(1)	132.	(4)
105.	(3)	112.	(1)	119.	(4)	126.	(2)	133.	(1)
106.	(3)	113.	(3)	120.	(4)	127.	(3)	134.	(1)
107.	(4)	114.	(3)	121.	(4)	128.	(3)	135.	(3)

SECTION-B

136.	(1)	139.	(2)	142.	(1)	145.	(4)	148.	(3)
137.	(2)	140.	(3)	143.	(4)	146.	(2)	149.	(4)
138.	(3)	141.	(4)	144.	(4)	147.	(1)	150.	(1)

(ZOOLOGY)

SECTION-A

151.	(2)	158.	(4)	165.	(2)	172.	(1)	179.	(3)
152.	(1)	159.	(1)	166.	(3)	173.	(1)	180.	(2)
153.	(3)	160.	(4)	167.	(4)	174.	(1)	181.	(3)
154.	(3)	161.	(3)	168.	(3)	175.	(4)	182.	(1)
155.	(3)	162.	(2)	169.	(4)	176.	(3)	183.	(3)
156.	(2)	163.	(4)	170.	(3)	177.	(2)	184.	(3)
157.	(3)	164.	(3)	171.	(3)	178.	(4)	185.	(1)

SECTION-B

186.	(4)	189.	(3)	192.	(2)	195.	(1)	198.	(2)
187.	(2)	190.	(2)	193.	(3)	196.	(2)	199.	(1)
188.	(2)	191.	(2)	194.	(1)	197.	(2)	200.	(4)

Hints and Solution

(PHYSICS)

SECTION-A

1. (3)

$\sqrt{3}x = 3y + 5$

$y = \frac{x}{\sqrt{3}} - \frac{5}{3}$

Slope = $\frac{1}{\sqrt{3}}$

2. (3)

$X^2 - Y^2$, subtraction is not possible because of different dimensions.

(NEW NCERT 11th Page No. 7, 8)

3. (1)

Here angle is taken from displacement axis. So angle from time axis is

$90° - 60° = 30°$

Now $v = \tan 30° = \frac{1}{\sqrt{3}}$

(NEW NCERT 11th Page No. 14)

4. (4)

$\frac{R}{T^2} = \frac{u^2 \sin 2\theta \times g^2}{g.4u^2 \sin^2\theta} = \frac{g}{2}\cot\theta$

i.e., $gT^2 = 2R \tan\theta$

If T is tripled, then R becomes 9 times.

(NEW NCERT 11th Page No. 39, 40)

5. (3)

$W = \frac{1}{2}k\left(x_2^2 - x_1^2\right) = \frac{1}{2} \times 5 \times 10^3 \left(30^2 - 15^2\right) \times 10^{-4}$

= 168.75 J

(NEW NCERT 11th Page No. 80)

6. (3)

$y = (t-5)^3 \Rightarrow v = \frac{dy}{dt} = 3(t-5)^2$

At $t = 0; v_1 = 75$ m/s and at t = 10 sec, v_2 = 75 m/s

So, change in kinetic energy = Work done

$= \frac{1}{2}mv_2^2 - \frac{1}{2}mv_1^2 = 0$

(NEW NCERT 11th Page No. 76, 77)

7. (3)

$P = \sqrt{2mE}$. If E are same then $P \propto \sqrt{m}$

$\Rightarrow \quad \frac{P_1}{P_2} = \sqrt{\frac{m_1}{m_2}} = \sqrt{\frac{9}{25}} = \frac{3}{5}$

(NEW NCERT 11th Page No. 74, 75)

8. (1)

$T = \frac{mv^2}{r}$

$\Rightarrow \quad 36 = \frac{0.36 \times v^2}{2.25}$

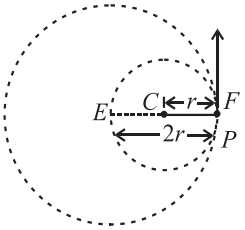
$\Rightarrow \quad v = 15$ m/s

(NEW NCERT 11th Page No. 63, 64)

9. (2)

Angular velocity of particle P about point E,

$\omega_E = \frac{4}{r_{EF}} = \frac{4}{2r}$



Angular velocity of particle P about point C,

$\omega_C = \frac{4}{r_{FC}} = \frac{4}{r}$

Ratio $\frac{\omega_E}{\omega_C} = \frac{4/2r}{4/r} = \frac{1}{2}$.

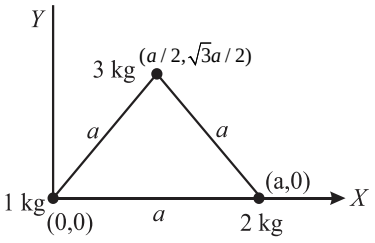
(NEW NCERT 11th Page No. 41, 42)

10. (1)

$V_{cm} = \frac{0.04 \times 15\hat{i} + 0.06 \times 15\hat{j} + 0.1 \times 15\hat{k}}{0.2}$

(NEW NCERT 11th Page No. 99)

11. (1)



$X_{cm} = \frac{m_1x_1 + m_2x_2 + m_3x_3}{m_1 + m_2 + m_3}$

$= \frac{1 \times 0 + 2 \times a + 3 \times \frac{a}{2}}{1+2+3} = \frac{7a}{12}$

(NEW NCERT 11th Page No. 96)

12. (2)

$a_t = 2.5\ \text{m/s}^2$

$v = 50\ \text{m/s}$

$r = 1000\ \text{m}$

Radial acceleration, $a_r = \dfrac{v^2}{r}$

$$a_r = \frac{50\times 50}{1000} = \frac{25}{10} = 2.5\,\text{m/s}^2$$

The acceleration of the car is

$$a = \sqrt{a_t{}^2 + a_r{}^2}$$

$$= \sqrt{2}\times 2.5 = \frac{5}{\sqrt{2}}\,\text{m/s}^2$$

(NEW NCERT 11th Page No. 41, 42)

13. (3)

Plastic body is defined as a body which cannot regain its shape after deforming force is removed.

Elastic limit is the limit beyond which property of elasticity vanishes.

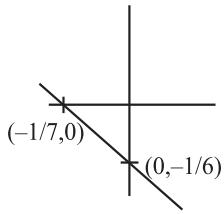
(NEW NCERT 11th Page No. 169)

14. (4)

$$\frac{p^2}{m^2 rg} = \frac{m^2 v^2}{m^2 rg} = \frac{\left(M^2\right)\left(LT^{-1}\right)^2}{\left(M^2\right)L^1\left(L^1T^{-2}\right)} = M^\circ L^\circ T^\circ$$

(NEW NCERT 11th Page No. 7)

15. (4)



$$7x + 6y + 1 = 0$$

$$7x + 6y = -1$$

$$\frac{7x}{-1} + \frac{6y}{-1} = 1$$

Intercept form $\dfrac{x}{-1/7} + \dfrac{y}{-1/6} = 1$

16. (4)

$\vec{A} = 4\hat{i} + 5\hat{j}$

$\vec{B} = 2\hat{i} + 2\hat{j} + 4\hat{k}$

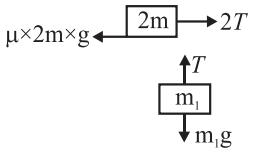
$\vec{A} + \vec{B} = 6\hat{i} + 7\hat{j} + 4\hat{k}$

$$\frac{\vec{A}+\vec{B}}{\left|\vec{A}+\vec{B}\right|} = \frac{6\hat{i}+7\hat{j}+4\hat{k}}{\sqrt{36+49+16}}$$

$$= \frac{6\hat{i}+7\hat{j}+4\hat{k}}{\sqrt{101}}$$

(NEW NCERT 11th Page No. 33)

17. (1)



$2T = \mu \times 2mg$

$T = m_1 g$

$2m_1 g = \mu \times 2mg$

$$m_1 = \mu \times m = 0.4m = \frac{2}{5}m$$

(NEW NCERT 11th Page No. 60)

18. (2)

$m_1 = 20\,\text{kg};\ m_2 = 40\,\text{kg};\ F = 300N;\ a_1 = 14ms^{-2}$

For mass $m_1; F_1 = m_1 a_1 = 20\times 14 = 280N$

For mass m_2;

$300 - F_1 = 40 \times a_2$

$300 - 280 = 40 \times a_2$

$$a_2 = \frac{20}{40} = \frac{1}{2}ms^{-2}$$

(NEW NCERT 11th Page No. 54, 65)

19. (1)

Strain $S = \dfrac{\Delta L}{L} = \dfrac{F}{AY}$

$$\frac{S_1}{S_2} = \frac{F_1}{A_1 Y_1}\frac{A_2 Y_2}{F_2} = 1\ \left\{\because F_1 = F_2, A_1 = A_2\ \&\ Y_1 = Y_2\right\}$$

$$\therefore\quad \frac{S_1}{S_2} = \frac{1}{1}$$

(NEW NCERT 11th Page No. 170)

20. (3)

For negotiating curve without friction $\tan\theta = \dfrac{V^2}{rg}$

$V = \sqrt{rg\tan\theta}$

= 20 m/s

72 km/h

(NEW NCERT 11th Page No. 63)

21. (2)

Work done on pushing the block is.

W = mgh (as no work done against friction)

$15 \times 9.8 \times 5$

$\Rightarrow \quad W = 735$ J

(NEW NCERT 11th Page No. 70)

22. (2)

If the body strikes the sand floor with a velocity v, then Mgh = $\frac{1}{2}Mv^2$

Let F be the resisting force acting on the body. Then, the resultant force = $F - Mg$

Using work-energy theorem

$$(F - Mg)x = \frac{1}{2}Mv^2$$

$$(F - Mg)x = Mgh$$

$$\Rightarrow \quad x = \frac{h}{\frac{F}{Mg} - 1}$$

(NEW NCERT 11th Page No. 78)

23. (4)

$$\frac{1}{2}mv^2 = \mu mg.x + \frac{1}{2}kx^2$$

$$\frac{1}{2} \times 2 \times v^2 = (0.5)(2)(10)(8) + \frac{1}{2}(4.5)64$$

$$v^2 = 80 + 4.5 \times 32 = 224$$

$v \simeq 15$ m/s

(NEW NCERT 11th Page No. 73)

24. (1)

Relation between potential energy and force is

$$\vec{F} = -\frac{dU}{dx}\hat{i} - \frac{dU}{dy}\hat{j} - \frac{dU}{dz}\hat{k}$$

Given $U(x, y) = \sin(x - y)$,

$$\Rightarrow \vec{F} = -\cos(x-y)\hat{i} + \cos(x-y)\hat{j}$$

$$\Rightarrow \vec{F}_{(O,\frac{\pi}{2})} = -\cos\left(\frac{-\pi}{2}\right)\hat{i} + \cos\left(\frac{-\pi}{2}\right)\hat{j}$$

$$\Rightarrow \vec{F}_{(O,\frac{\pi}{2})} = 0\hat{i} + 0\hat{j}$$

$$\Rightarrow \left|\vec{F}\right| = 0\text{N}$$

(NEW NCERT 11th Page No. 77)

25. (2)

Since $a_c = p^3rt^2$

$$\frac{v^2}{r} = p^3rt^2$$

$$v^2 = p^3r^2t^2$$

$$v = p^{3/2}rt$$

$$F = \frac{mdv}{dt} = mp^{3/2}r$$

Power = $F \times v$

$$= \left(mp^{3/2}r\right) \times \left(p^{3/2}rt\right)$$

$$= mp^3r^2t$$

(NEW NCERT 11th Page No. 83)

26. (4)

Maximum tension = $\frac{mv^2}{r}$

$$\Rightarrow \quad \frac{8 \times 24^2}{72} = 64 \text{ N}$$

(NEW NCERT (Page No. 63)

27. (1)

The position vector of COM of the three particles is given by

$$\vec{r}_{\text{COM}} = \frac{m_1\vec{r}_1 + m_2\vec{r}_2 + m_3\vec{r}_3}{m_1 + m_2 + m_3}$$

Substituting the values, we get

$$\vec{r}_{\text{COM}} = \frac{(2)(\hat{i} + 5\hat{j} + \hat{k}) + (3)(\hat{i} + 2\hat{j} + \hat{k}) + (4)(2\hat{i} + \hat{j} - 2\hat{k})}{2 + 3 + 4}$$

$$\vec{r}_{\text{COM}} = \frac{13\hat{i} + 20\hat{j} - 3\hat{k}}{9}$$

(NEW NCERT 11th Page No. 96)

28. (3)

Given,

$I = 30$ kgm^2

$K_r = 1500$ J

The rotational kinetic energy is given by

$$K_r = \frac{1}{2}I\omega^2$$

$$1500 = \frac{1}{2} \times 30 \times \omega^2$$

$$\omega^2 = 100$$

$$\omega = 10 \text{ rad/sec}$$

$$2\pi f = 10 \text{ rad/sec}$$

$$f = \frac{10}{2\pi} \text{ Hz} = \frac{5}{\pi} \text{ Hz}$$

(NEW NCERT 11th Page No. 114, 115)

29. (4)

Formula used: $\vec{L} = \vec{r} \times \vec{P} = m(\vec{r} \times \vec{v})$

Given: $r = (\hat{i} + \hat{k}), \vec{v} = 3(\hat{i} - \hat{j} + \hat{k}), m = \sqrt{2}$ kg

Substituting the values, we get

$$= \sqrt{2}[(\hat{i} + \hat{k})] \times 3[(\hat{i} - \hat{j} + \hat{k})]$$

$$\vec{L} = \sqrt{2}(3\hat{i} - 3\hat{k})$$

$$L = 6 \text{ kg m}^2\text{/s}$$

(NEW NCERT 11th Page No. 106)

30. (2)

$K_i = \frac{1}{2}mv^2$

$K_f = \frac{1}{2}m(v+3)^2$

$K_f = 3K_i$

$\frac{1}{2}m(v+3)^2 = \frac{1}{2}mv^2$

On solving we get,

$v = \frac{3(\sqrt{3}+1)}{2}$

(NEW NCERT 11th Page No. 75, 75)

31. (1)

$I_{\text{Resultant}} = \frac{MR^2}{2} + \frac{MR^2}{4}$

$= \frac{3MR^2}{4}$

(NEW NCERT 11th Page No. 115, 116)

32. (2)

$\Delta l = \frac{Mgl}{2AY} = \frac{20\times10\times20}{2\times0.4\times2\times10^{11}}$

$= \frac{4\times10^4}{2\times4\times2}\times10^{-11}$

$= 0.25 \times 10^{-7}$

$= 25 \times 10^{-9}$ m

(NEW NCERT 11th Page No. 170, 171)

33. (1)

Let I be the moment of inertia of the body. Then

total $KE = \frac{1}{2}mv^2 + \frac{1}{2}I\omega^2$

or $KE = \frac{1}{2}mv^2 + \frac{1}{2}I\frac{v^2}{R^2}, \left(\omega = \frac{v}{R}\right)$

according to energy conservation loss in KE = gain in PE.

or $\frac{1}{2}\left(m + \frac{I}{R^2}\right)v^2 = mgh = mg\left(\frac{7v^2}{10g}\right)$

solving this, we get $I = \frac{2}{5}mR^2$

i.e., the body is a solid sphere

(NEW NCERT 11th Page No. 114)

34. (1)

Initial kinetic energy is $K = \frac{1}{2}mu^2$

The velocity at highest point $v_x = u\cos\theta$

Kinetic energy of a particle at highest point

$K_H = \frac{1}{2}mv_x^2 = \frac{1}{2}mu^2\cos^2\theta$

$= K \times \cos^2 45° = \frac{K}{2}$

(NEW NCERT 11th Page No. 72, 74)

35. (4)

Potential energy $U = \frac{1}{2}kx^2$ *i.e.* $U \propto x^2$

This is a equation of parabola, so graph between U and x is a parabola.

(NEW NCERT 11th Page No. 80)

SECTION-B

36. (4)

$\Rightarrow \quad h_1 = e^2h$

$\Rightarrow \quad h_1 = (0.4)^2 \times 2 = 0.32 \ m$

(NEW NCERT 11th Page No. 84)

37. (4)

In translation, $v_1 = \sqrt{2\,gh}$

In Rolling, $v_2 = \sqrt{\frac{2gh}{\left(1+\frac{K^2}{R^2}\right)}} < v_1$

(NEW NCERT 11th Page No. 114)

38. (1)

(A) $\sqrt{4|\vec{B}|^2 + |\vec{B}|^2 + 2\times2|\vec{B}|\times|\vec{B}|\cos\theta} = |\vec{B}|$

$\sqrt{5|\vec{B}|^2 + 4|\vec{B}|^2\cos\theta} = |\vec{B}|$

$\sqrt{5+4\cos\theta} = 1$

$4\cos\theta = -4$

$\cos\theta = -1$

$\theta = 180°$

(B) $|\vec{F}_1 + \vec{F}_2| = |\vec{F}_1| + |\vec{F}_2| = 10 + 16 = 26$

(C) $\vec{A}.\vec{B} = |\vec{A}||\vec{B}|\cos\theta$

$\cos\theta = \left(\frac{\vec{A}.\vec{B}}{|\vec{A}||\vec{B}|}\right)$

$\cos\theta = \frac{(\hat{i}+\hat{j}).(5\hat{k})}{\sqrt{2}\times5} = 0$

$\theta = 90°$

(D) $\vec{A} + \vec{B} = \hat{i} + 2\hat{j} + 4\hat{k}$

$|\vec{A} + \vec{B}| = \sqrt{21}$

(NEW NCERT 11th Page No. 34, 72, 33)

39. (3)

Option *A* is incorrect. If the velocity is zero at an instant, then acceleration may not necessarily be zero at that instant.

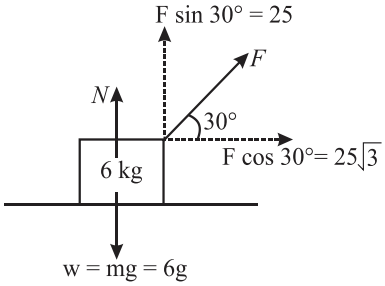
For e.g. when an object is thrown vertically upward, at the highest point the velocity is zero but acceleration on it due to gravity is non-zero.

Option *B* is incorrect because if the velocity and acceleration are in opposite direction then the object will slow down.

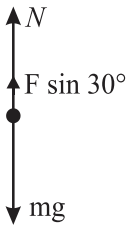
Option *C* is incorrect because if the position and velocity have opposite sign the particle will move towards origin.

(NEW NCERT 11th Page No. 14, 15)

40. (4)



Form diagram: F. B. D



$\sum F_y = 0$ (as body moves in horizontal direction)

(NEW NCERT 11th Page No. 65)

41. (3)

CM of uniform semicircular disc of radius $R = \frac{4R}{3\pi}$ from the center

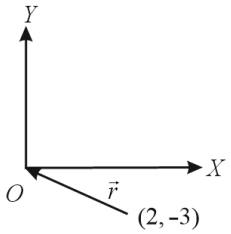
CM of uniform semicircular ring of radius $R = \frac{2R}{\pi}$ from the center

CM of solid hemisphere of radius $R = \frac{3R}{8}$ from the center

CM of hemisphere shell of radius $R = \frac{R}{2}$ from the center

(NEW NCERT 11th Page No. 97)

42. (4)



$\tau = \vec{r} \times \vec{F} = (-2\hat{i} + 3\hat{j}) \times (-\hat{k}) = -3\hat{i} - 2\hat{j}$

$\tau = -(3\hat{i} + 2\hat{j})$

(NEW NCERT 11th Page No. 106)

43. (3)

$\frac{\Delta V}{V} = -\frac{P}{B} \quad \left\{\frac{\Delta V}{V} = \frac{-0.04}{100}\right\}$

$P = 200\ atm = 200 \times 1.01 \times 10^5\ Pa$ or N/m^2

So $B = 200 \times 1.01 \times 10^5 \times \frac{100}{0.04} = 5.05 \times 10^{10}$ N/m^2

(NEW NCERT 11th Page No. 173)

44. (1)

$x = 3t \Rightarrow u_x = \frac{dx}{dt} = 3$

$y = 4t^2 \Rightarrow u_y = \frac{dy}{dt} = 8t$

$\tan\theta = \frac{u_y}{u_x} = \frac{8t}{3}$

$\therefore$ differentiating with respect to time we get,

$\left(\sec^2\theta\right)\frac{d\theta}{dt} = \frac{8}{3}$

or $\left(1 + \tan^2\theta\right)\frac{d\theta}{dt} = \frac{8}{3}$; or $\left(1 + \frac{64}{9}t^2\right)\frac{d\theta}{dt} = \frac{8}{3}$

or $\frac{d\theta}{dt} = \frac{\frac{8}{3}}{1 + \frac{64}{9}t^2}$; $\frac{d\theta}{dt}$ at $t = 3$ s is

$\frac{d\theta}{dt} = \frac{8}{195}$ rad/s

(NEW NCERT 11th Page No. 35)

45. (4)

$\frac{F}{4A} = Y \times \frac{\Delta L}{3L}$

$F = \frac{4AY}{3L}\Delta L$

Comparing with $F = K\Delta L$, we get $K = \frac{4AY}{3L}$

(NEW NCERT 11th Page No. 170)

46. (1)

Case (i) when acceleration in lift is upward.

$N_1 = W + F_s$

$N_1 = mg + ma$

Case (ii) when acceleration in lift is downward.

$N_2 = W - ma = mg - ma$

$\therefore \quad \frac{N_1}{N_2} = \frac{3}{1}$

$\frac{mg + ma}{mg - ma} = \frac{3}{1}$

$mg + ma = 3mg - 3ma$

$4ma = 2mg$

$\therefore \quad a = \frac{g}{2}$

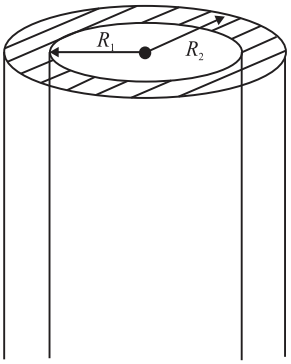
(NEW NCERT 11th Page No. 65)

47. (4)

$\frac{1}{k} = \frac{1}{k_1} + \frac{1}{k_2}$ or $k = \frac{k_1 k_2}{k_1 + k_2} = \frac{12k^2}{7k} = \frac{12k}{7}$

(NEW NCERT 11th Page No. 59)

48. (1)



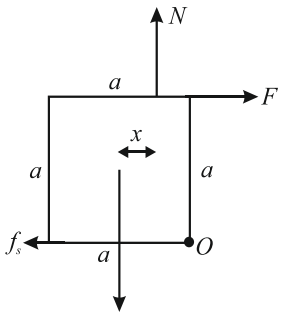
Thickness $= (R_2 - R_1) \pm (\Delta R_1 + \Delta R_2)$

$\Rightarrow \quad (3.79 - 2.23) \pm (0.02 + 0.01)$

$\Rightarrow \quad 1.56 \pm 0.03$

(NEW NCERT 11th Page No. 55)

49. (2)



$(\tau_0)_{net} = 0$

$\therefore \quad N\left(\frac{a}{2} - x\right) + Fa = mg\frac{a}{2}$

or $\quad N\left(\frac{a}{2} - x\right) + \frac{mga}{4} = \frac{mga}{2}$

$N\left(\frac{a}{2} - x\right) = \frac{mga}{4}$

But $N = mg$

$\therefore \quad mg\frac{a}{2} - mgx = \frac{mga}{4}$

or $\quad x = \frac{a}{2} - \frac{a}{4} = \frac{4a - 2a}{8} = \frac{a}{4}$

(NEW NCERT 11th Page No. 110)

50. (1)

Force $F = -kx = -20x$

At x = 15 cm = .15 m

$F = -20 \times .15 = -3$

Acceleration $a = \frac{-3}{.1} = -30\ \text{m/s}^2$

(NEW NCERT 11th Page No. 54)

(CHEMISTRY)

SECTION-A

51. (2)

Total rupees = $10 \times 6.022 \times 10^{23} = 6.022 \times 10^{24}$

if we spend Rs. 1,00,000 in 1 sec,

then Rs 6.022×10^{24} will be spent in $(6.022 \times 10^{24}/1{,}00{,}000) = 6.022 \times 10^{19}$ sec.

6.022×10^{19} sec $= 6.022 \times 10^{19}/(60 \times 60 \times 24 \times 365) = 1.909 \times 10^{12}$ years

(NEW NCERT 11th Part-I Page. No. 8)

52. (3)

$40.6 = x\,(40) + (1 - x)41$

$40.6 = 40x + 41 - 41x$

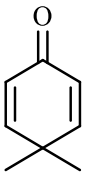
$x = 0.4$

$1 - x = 0.6$

Abundance of Z^{40} in nature is 40% and Abundance of Z^{41} in nature is 60%

(NEW NCERT 11th Part-I Page. No. 17)

53. (2)



this compound cannot show tautomerism.

(NEW NCERT 11th Part-II Page. No. 270)

54. (4)

Refer theory.

(NEW NCERT 11th Part-I Page. No. 23)

55. (1)

Let mass of oxide = 100gm

Mass of oxygen = 26gm

Mass of metal = 74gm

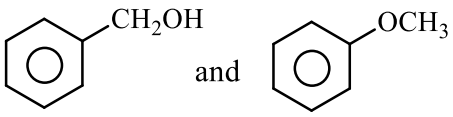
Moles of oxygen = 26/16 = 1.6

Moles of metal = 74/23 = 3.2

Empirical formula will be M_2O .

(NEW NCERT 11th Part-I Page. No. 19)

56. (2)



These are functional isomers.

(NEW NCERT 11th Part-II Page. No. 270)

57. (3)

$$ROH + CH_3MgBr \rightarrow CH_4 + Mg(OR)(Br)$$

22400 mL of CH_4 produced at STP

$= 1$ mol of ROH

2.24 mL of CH_4 produced at STP $= \frac{2.24}{22400}$ mol

Now molecular mass of ROH $= \frac{5.6\times10^{-3}}{10^{-4}}$

$\therefore$ mol mass of ROH $= 56$

(NEW NCERT 11th Part-I Page. No. 21)

58. (4)

All the three structures are isomers of benzene.

(NEW NCERT 11th Part-II Page. No. 270)

59. (1)

$$\text{Conc.(in ppm)} = \frac{0.5}{600}\times10^6 = 833.33\text{ppm}$$

(NEW NCERT 11th Part-I Page. No. 21)

60. (2)

$CaCO_3 \rightarrow CaO + CO_2$

100 gm of $CaCO_3$ produces 22.4L at S.T.P.

10 gm of $CaCO_3$ produces 2.24L CO_2.

(NEW NCERT 11th Part-I Page. No. 21)

61. (4)

$$\Delta p = m\times\Delta v$$

$$\Delta p = 9.1\times10^{-28}\times4.0\times10^5\times\frac{0.014}{100}$$

$$\Delta p = 509.6\times10^{-28}$$

$$\text{Hence, } \Delta x = \frac{h}{\Delta p\times4\pi} = \frac{6.626\times10^{-27}}{509.6\times10^{-28}\times4\times3.14}$$

$$\Delta x = 0.010\text{ cm}$$

(NEW NCERT 11th Part-I Page. No. 50)

62. (4)

Alkyl halide cannot exhibit functional isomerism as the functional group remain same i.e. halogens.

(NEW NCERT 11th Part-II Page. No. 270)

63. (1)

$$E_n = -13.6\frac{Z_1^2}{n_1^2} = -13.6\frac{Z_2^2}{n_2^2}$$

$$\frac{1}{n_1^2} = \frac{9}{n_2^2} \Rightarrow \frac{n_2^2}{n_1^2} = 9 \Rightarrow \frac{n_2}{n_1} = 3$$

(NEW NCERT 11th Part-I Page. No. 46)

64. (2)

Given: $n_1 = 1$ and $n_2 = 6$.

We know, Total number of spectral line $= \frac{(n_2 - n_1)(n_2 - n_1 + 1)}{2}$

So, total number of spectral lines

$$= \frac{(6-1)(6-1+1)}{2} = 15$$

(NEW NCERT 11th Part-I Page. No. 44)

65. (1)

C_4H_{10} → n-butane and isobutane are two chain isomers.

C_5H_{12} → n-pentane, isopentane and neopentane are three chain isomers.

(NEW NCERT 11th Part-II Page. No. 270)

66. (3)

$$\frac{hc}{\lambda} = \frac{hc}{\lambda_1} + \frac{hc}{\lambda_2}$$

$$\frac{1}{\lambda} = \frac{1}{\lambda_1} + \frac{1}{\lambda_2}$$

$$\frac{1}{300} = \frac{1}{500} + \frac{1}{\lambda_2}$$

$$\lambda_2 = 750\text{ nm}$$

(NEW NCERT 11th Part-I Page. No. 41)

67. (4)

As we know, $n_1 = 1$

Number of lines = $(n_2 - n_1 + 1)(n_2 - n_1)/2 = 6$

$n = 4$.

Three lines are observed in the ultraviolet region of the spectrum. These corresponds to the transitions $4 \rightarrow 1, 3 \rightarrow 1, 2 \rightarrow 1$ So, number of lines in U.V. (Lyman series) spectrum = 3.

(NEW NCERT 11th Part-I Page. No. 44)

68. (2)

According to Hund's rule electrons are distributed among the orbitals of subshell in such a way so as to give maximum number of unpaired electron with parallel spin. i.e. in a subshell pairing of electron will not start until and unless all the orbitals of that subshell will get one electron each with same spin. So, only Mn can have one unpaired electron due to odd number of electrons.

(NEW NCERT 11th Part-I Page. No. 62)

69. (2)

The process is an isothermal expansion.

Hence, $q = -W$

$\Delta E = 0$

$$W = -2.303nRT\log\frac{V_2}{V_1}$$

$$= -2.303 \times 0.05 \times 8.314 \times 320 \times \log\left(\frac{500}{100}\right)$$

$$= -214.4 \text{ J}$$

$q = +214.4,\ W = -214.4$ (expansion work)

(NEW NCERT 11th Part-I Page. No. 142)

70. (1)

Value of m = –1 represents one orbital.

Therefore, maximum number of electrons will be two.

(NEW NCERT 11th Part-I Page. No. 62)

71. (4)

$$2\overset{+2}{Hg}Cl_2 + \overset{+2}{Sn}Cl_2 \rightarrow \overset{+1}{Hg_2}Cl_2 + \overset{+4}{Sn}Cl_4$$

Hg undergoes reduction while Sn undergoes oxidation.

(NEW NCERT 11th Part-II Page. No. 237)

72. (1)

$$10I^- + 16H^+ + 2\overset{+7}{Mn}O_4^- \rightarrow 5I_2 + 2\overset{+2}{Mn} + 8H_2O$$

(NEW NCERT 11th Part-II Page. No. 237)

73. (1)

$2K_2CrO_4 + 2HCl \rightarrow 1K_2Cr_2O_7 + 2KCl + 1H_2O$

$x + y - z = 2$

(NEW NCERT 11th Part-II Page. No. 246)

74. (2)

$$\overset{+1}{Cu}_2\overset{-2}{S} + 2\overset{+2}{Fe}O \rightarrow 2\overset{0}{Cu} + 2\overset{0}{Fe} + \overset{+4}{S}O_2$$

FeO reduced to Fe and in Cu_2S, Cu^{+1} reduced to Cu and S^{-2} oxidised to SO_2.

(NEW NCERT 11th Part-II Page. No. 237)

75. (4)

For an adiabatic process, work done is given by-

$$W = nC_V dT$$

As the gas is monoatomic,

$$C_V = \frac{3}{2}R$$

$$\therefore W = \frac{3}{2}nRdT$$

$$100 = \frac{3}{2} \times 0.20 \times 2 \times (T - 530)$$

$$\Rightarrow T - 530 = \frac{100}{0.6}$$

$$\Rightarrow T = 696.7K$$

(NEW NCERT 11th Part-II Page. No. 145)

76. (3)

$$2KMnO_4 + 5C_2O_4^{2-} + 16H^+ \rightarrow 2Mn^{2+} + 2K^+ + 10CO_2 + 8H_2O$$

$$KMnO_4 + 5Fe^{2+} + 8H^+ \rightarrow K^+ + 5Fe^{3+} + Mn^{2+} + 4H_2O$$

From the above equations, it is observed that 3 moles of $KMnO_4$ will be needed to react completely with five moles of ferrous oxalate in acidic solution.

No. of equivalents of $KMnO_4$ = No. of equivalents of FeC_2O_4

Equivalents of $KMnO_4$ = n x no. of moles = $5 \times x$

Equivalents of $FeC_2O_4 = 3 \times 1 = 3$

$5x = 3$

$x = \frac{3}{5}$

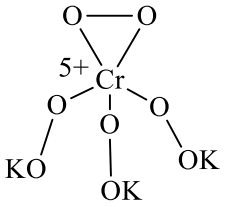
(NEW NCERT 11th Part-II Page. No. 237)

77. (1)

Refer Theory.

(NEW NCERT 11th Part-I Page. No. 146)

78. (1)



(NEW NCERT 11th Part-II Page. No. 239)

79. (2)

The priority of –CN group is more than –CHO group.

(NEW NCERT 11th Part-II Page. No. 267)

80. (1)

Internal energy is an extensive property and also a state function.

(NEW NCERT 11th Part-I Page. No. 144)

81. (1)

Propane-1,2,3-tricarboxylic acid is the correct IUPAC name of the given compound.

(NEW NCERT 11th Part-II Page. No. 267)

82. (3)

1,6-Dimethyl cyclohexene is the correct IUPAC name of compound given in option 3.

(NEW NCERT 11th Part-II Page. No. 265)

83. (2)

In (2), 3 moles of gas becomes 1 mole of liquid. If greater number of molecules transforms into a small number of molecules then entropy decreases. Also in (2) gas molecules changes to liquid, hence entropy decreases. Hence (2) has the most negative change in entropy

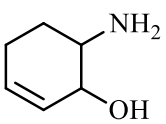
(NEW NCERT 11th Part-I Page. No. 158)

84. (3)

Sulphonic group is more prior as compared to other group so 6-Methyl-4-oxohept-6-ene-1-sulphonic acid is the correct IUPAC name of given compound.

(NEW NCERT 11th Part-II Page. No. 267)

85. (1)



6-Aminocyclohex-2-ene-1-ol.

(NEW NCERT 11th Part-II Page. No. 265)

SECTION-B

86. (2)

For metal oxide M_2O_x,

Let weight of oxide = 100gm

weight of metal = 60gm

weight of oxygen = 40gm

Gram Eq. of oxygen = Gram Eq. of metal

$$\frac{40}{16/2} = \frac{60}{MW/x} \Rightarrow x = \frac{MW}{12}$$

For metal chloride MCl_x,

$MW + x(35.5) = 95$

On putting the value of x in the above equation, we get MW = 24

(NEW NCERT 11th Part-I Page. No. 16)

87. (2)

$PbO + 2HCl \rightarrow PbCl_2 + H_2O$

Atomic mass of PbO = 207 + 16 = 223

Atomic mass of HCl = 36.5

From the above chemical equation, we see that HCl is the limiting reagent.

1 mole of PbO gives 1 mole of $PbCl_2$

223 gm of PbO forms 1 mole of $PbCl_2$.

3 gm of PbO forms 3/223 = 0.013 mole of $PbCl_2$

(NEW NCERT 11th Part-I Page. No. 21)

88. (2)

For ABC_5,

Overall charge = 1 + 4 + 5(–1) = 0

(NEW NCERT 11th Part-I Page. No. 17)

89. (2)

Meso-3,4-dibromohexane will have one configuration as R and other S.

(NEW NCERT 11th Part-II Page. No. 271)

90. (1)

Velocity of electron, $v_n = 2.18\times10^6 \frac{Z}{n} ms^{-1} (Z = 1$ for $H)$

The distance travelled by the electron in third Bohr's orbit in 4×10^{-7}s

$$= \frac{2.18\times10^6 \times 4.0\times10^{-7}}{3} \text{ m} = 0.29 \text{ m}$$

The circumference of third orbit

$$= 2\pi r = 2\pi \times \left(0.529 \times \frac{n^2}{z}\right)$$

$$= 2\pi\left(0.529 \times \frac{9}{1}\right) = 29.89\times10^{-10} \text{ m}$$

$$\text{Number of revolutions} = \frac{0.29}{29.89\times10^{-10}} = 9.7\times10^7$$

(NEW NCERT 11th Part-I Page. No. 46)

91. (1)

In fully eclipsed conformation, the steric strain is maximum. Hence this conformation is most unstable. This is because of the repulsion between methyl-methyl group which are very close together.

(NEW NCERT 11th Part-II Page. No. 271)

92. (2)

Radius of n^{th} Bohr's orbit, $r_n = 0.529\frac{n^2}{z}$

(NEW NCERT 11th Part-I Page. No. 46)

93. (2)

Entropy of the system increases with increase in temperature. This is because when the temperature increases, the randomness of the molecule increases.

(NEW NCERT 11th Part-I Page. No. 158)

94. (3)

Given that, $v_1 = 3v_2$

For case -1, $\frac{1}{2}m(3v_2)^2 = \frac{hc}{\lambda_1} - \phi$

For case -2, $\frac{1}{2}m(v_2)^2 = \frac{hc}{\lambda_2} - \phi$

$$\Rightarrow \frac{hc}{\lambda_1} - \phi = \frac{9hc}{\lambda_2} - 9\phi$$

$$\Rightarrow 8\phi = \frac{9hc}{\lambda_2} - \frac{hc}{\lambda_1}$$

$$\Rightarrow \phi = \frac{1}{8}\left(9 \times \frac{1240}{500} - \frac{1240}{250}\right)$$

$$\Rightarrow \phi = 2.17\text{eV}$$

(NEW NCERT 11th Part-I Page. No. 41)

95. (3)

$$\overset{+2-1}{FeS_2} \rightarrow \overset{+6}{SO_4^{2-}} + \overset{+3}{Fe}$$

n-factor $= [1\times(3-2) + 2(6-(-1)] = 15$

So, eq. wt. of $FeS_2 = \frac{M}{15}$

(NEW NCERT 11th Part-I Page. No. 23)

96. (3)

In cyclic process, $\Delta U = 0$

$\Delta U = Q + W$

$Q = -W$

Q = Area under the circle = $\pi r^2 = \pi 10^2$

(NEW NCERT 11th Part-I Page. No. 141)

97. (1)

Alcohol oxidized with potassium dichromate to form acetic acid which is indicated by change in colour.

(NEW NCERT 11th Part-II Page. No. 247)

98. (3)

Ethyl-2-oxocyclohexanecarboxylate is the correct IUPAC name of the given compound.

(NEW NCERT 11th Part-II Page. No. 267)

99. (3)

$$pV^{\gamma} = \text{constant} \quad ...(i)$$

$$\left(\frac{RT}{V}\right)V^{\gamma} = \text{constant}$$

$$\Rightarrow TV^{\gamma-1} = \text{constant}$$

But $T \propto (V)^{-1/3}$ (given) or $TV^{1/3} = \text{constant}$

On equating,

$$\gamma - 1 = \frac{1}{3}$$

$$\text{or } \gamma = \frac{4}{3} = 1.33$$

$$\Rightarrow \frac{C_p}{C_v} = 1.33$$

(NEW NCERT 11th Part-I Page. No. 145)

100. (2)

5-Bromo-2-chloromethyl-1-fluoro-1-iodopent-1-ene is the correct IUPAC name of the given compound.

(NEW NCERT 11th Part-II Page. No. 267)

(BOTANY)

SECTION-A

101. (2)

Numerical taxonomy which is now easily carried out using computers is based on all observable characteristics. Number and codes are assigned to all the characters and the data are then processed. In this way each character is given equal importance and at the same time hundreds of characters can be considered. Cytotaxonomy that is based on cytological information like chromosome number, structure, behaviour and chemotaxonomy that uses the chemical constituents of the plant to resolve confusions, are also used by taxonomists these days.

(NEW NCERT 11th Page No. 24)

102. (4)

The golgi apparatus principally performs the function of packaging materials, to be delivered either to the intra-cellular targets or secreted outside the cell. Materials to be packaged in the form of vesicles from the ER fuse with the *cis* face of the golgi apparatus and move towards the maturing face. A number of proteins synthesised by ribosomes on the endoplasmic reticulum are modified in the cisternae of the golgi apparatus before they are released from its *trans* face. Golgi apparatus is the important site of formation of glycoproteins and glycolipids.

In animal cells, lipid-like steroidal hormones are synthesised in Smooth Endoplasmic Reticulum (SER).

(NEW NCERT 11th Page No. 95, 96)

103. (4)

The gametes of brown algae (phaeophyceae) are pyriform (pear-shaped) and bear two laterally attached flagella.

(NEW NCERT 11th Page No. 27)

104. (1)

The red thalli of most of the red algae are multicellular. Some of them have complex body organisation. The food is stored as floridean starch which is very similar to amylopectin and glycogen in structure. Majority of the red algae are marine with greater concentrations found in the warmer areas. They occur in both well-lighted regions close to the surface of water and also at great depths in oceans where relatively little light penetrates.

(NEW NCERT 11th Page No. 27)

105. (3)

Bryophytes include the various mosses and liverworts that are found commonly growing in moist shaded areas in the hills. Bryophytes are also called amphibians of the plant kingdom because these plants can live in soil but are dependent on water for sexual reproduction. They usually occur in damp, humid and shaded localities. They play an important role in plant succession on bare rocks/soil. The plant body of bryophytes is more differentiated than that of algae. It is thallus-like and prostrate or erect, and attached to the substratum by unicellular or multicellular rhizoids. They lack true roots, stem or leaves. They may possess root-like, leaf-like or stem-like structures.

(NEW NCERT 11th Page No. 29)

106. (3)

Pteridophytes are used for medicinal purposes and as soil-binders. *Marchantia* is a bryophyte.

(NEW NCERT 11th Page No. 28, 30)

107. (4)

The major pigments in the class of algae that store their food in the form of floridean starch i.e., red algae are chlorophyll *a*, *d* and phycoerythrin.

(NEW NCERT 11th Page No. 27)

108. (1)

A flower is asymmetric (irregular) if it cannot be divided into two similar halves by any vertical plane passing through the centre, as in canna.

(NEW NCERT 11th Page No. 62)

109. (3)

In parietal placentation, the ovules develop on the inner wall of the ovary or on peripheral part. Ovary is one-chambered but it becomes two chambered due to the formation of the false septum, e.g., mustard and *Argemone*.

(NEW NCERT 11th Page No. 65)

110. (2)

China rose features: Alternate phyllotaxy, superior ovary, twisted aestivation, monoadelphous stamens, axile placentation.

(NEW NCERT 11th Page No. 61, 64)

111. (2)

Tap roots of carrot, turnip and adventitious roots of sweet potato, get swollen and store food.

Axillary buds of stems may also get modified into woody, straight and pointed thorns. Thorns are found in many plants such as *Citrus*, *Bougainvillea*. Underground stems of potato, ginger, turmeric, *Zaminkand*, *Colocasia* are modified to store food in them. They also act as organs of perennation to tide over conditions unfavourable for growth.

The stems of maize and sugarcane have supporting roots coming out of the lower nodes of the stem called stilt roots.

(OLD NCERT 11th Page No. 67, 68)

112. (1)

Depending on whether the apex gets developed into a flower or continues to grow, two major types of inflorescences are defined – racemose and cymose. In racemose type of inflorescences the main axis continues to grow, the flowers are borne laterally in an acropetal succession.

(NEW NCERT 11th Page No. 61)

113. (3)

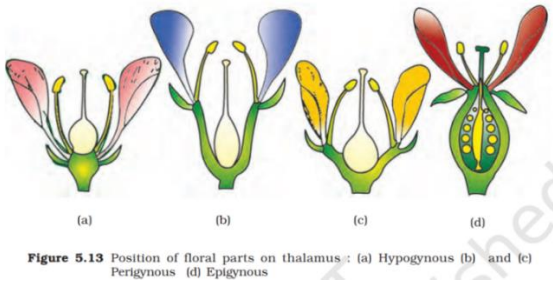


Figure 5.13 Position of floral parts on thalamus : (a) Hypogynous (b) and (c) Perigynous (d) Epigynous

(NEW NCERT 11th Page No. 62)

114. (3)

In mango, the pericarp is well differentiated into an outer thin epicarp, a middle fleshy edible mesocarp and an inner stony hard endocarp.

(NEW NCERT 11th Page No. 66)

115. (4)

In an isobilateral leaf, the stomata are present on both the surfaces of the epidermis; and the mesophyll is not differentiated into palisade and spongy parenchyma.

(NEW NCERT 11th Page No. 77)

116. (2)

In a dicot stem, the outer hypodermis, consists of a few layers of collenchymatous cells just below the epidermis, which provide mechanical strength to the young stem.

(NEW NCERT 11th Page No. 75)

117. (1)

In grasses, certain adaxial epidermal cells along the veins modify themselves into large, empty, colourless cells. These are called bulliform cells.

(NEW NCERT 11th Page No. 77)

118. (2)

In dicot stem, a large number of vascular bundles are arranged in a ring ; the 'ring' arrangement of vascular bundles is a characteristic of dicot stem. Each vascular bundle is conjoint, open, and with endarch protoxylem.

(NEW NCERT 11th Page No. 76)

119. (4)

The trichomes in the shoot system are usually multicellular. They may be branched or unbranched and soft or stiff. They may even be secretory. The trichomes help in preventing water loss due to transpiration.

(NEW NCERT 11th Page No. 72)

120. (4)

The outside of the epidermis is often covered with a waxy thick layer called the cuticle which prevents the loss of water. Cuticle is absent in roots. Stomata are structures present in the epidermis of leaves. Stomata regulate the process of transpiration and gaseous exchange. Each stoma is composed of two beans shaped cells known as guard cells which enclose stomatal pore. The guard cells possess chloroplasts and regulate the opening and closing of stomata. Sometimes, a few epidermal cells, in the vicinity of the guard cells become specialised in their shape and size and are known as subsidiary cells.

(NEW NCERT 11th Page No. 72)

121. (4)

In monocot stem, the phloem parenchyma is absent, and water-containing cavities are present within the vascular bundles.

(NEW NCERT 11th Page No. 76)

122. (1)

The internal tissue organisation in dicot root are as follows:

The outermost layer is epiblema. Many of the cells of epiblema protrude in the form of unicellular root hairs. The cortex consists of several layers of thin-walled parenchyma cells with intercellular spaces. The innermost layer of the cortex is called endodermis.

(NEW NCERT 11th Page No. 74)

123. (2)

The floral diagram and floral formula in the figure below represent the mustard plant (Family: Brassicaceae/Cruciferae).

$\oplus \male\female K_{2+2} C_4 A_{2+4} \underline{G_{(2)}}$

(NEW NCERT 11th Page No. 67)

124. (4)

Formation of synaptonemal complex takes place during zygotene.

The beginning of diplotene is recognised by the dissolution of the synaptonemal complex and the tendency of the recombined homologous chromosomes of the bivalents to separate from each other except at the sites of crossovers.

(NEW NCERT 11th Page No. 126)

125. (1)

Ribosomes are the granular structures first observed under the electron microscope as dense particles by George Palade (1953). They are composed of ribonucleic acid (RNA) and proteins and are not surrounded by any membrane. The eukaryotic ribosomes are 80S while the prokaryotic ribosomes are 70S. Each ribosome has two subunits, larger and smaller subunits. The two subunits of 80S ribosomes are 60S and 40S while that of 70S ribosomes are 50S and 30S.

(NEW NCERT 11th Page No. 98)

126. (2)

Chrysophytes, Dinoflagellates and Euglenoids are photosynthetic protists. Slime moulds are saprophytic. Protozoans are heterotrophic.

(NEW NCERT 11th Page No. 14, 15)

127. (3)

All tissues on the innerside of the endodermis such as pericycle, vascular bundles and pith constitute the stele.

(NEW NCERT 11th Page No. 74)

128. (3)

Agaricus (mushroom) is a member of basidiomycetes.

(NEW NCERT 11th Page No. 18)

129. (2)

The key features of metaphase are:

Spindle fibres attach to kinetochores of chromosomes.

Chromosomes are moved to spindle equator and get aligned along metaphase plate through spindle fibres to both poles.

(NEW NCERT 11th Page No. 123)

130. (1)

Lion (*Panthera leo*), leopard (*P. pardus*) and tiger (*P. tigris*) with several common features, are all species of the genus *Panthera. Solanum tuberosum* is the scientific name for potato.

(NEW NCERT 11th Page No. 06)

131. (4)

Meiosis is the mechanism by which conservation of specific chromosome number of each species is achieved across generations in sexually reproducing organisms, even though the process, per se, paradoxically, results in reduction of chromosome number by half. It also increases the genetic variability in the population of organisms from one generation to the next.

(NEW NCERT 11th Page No. 128)

132. (4)

As we go higher from species to kingdom, the number of common characteristics goes on decreasing.

(NEW NCERT 11th Page No. 08)

133. (1)

The vertical section of a dorsiventral leaf through the lamina shows three main parts, namely, epidermis, mesophyll and vascular system. The epidermis which covers both the upper surface (adaxial epidermis) and lower surface (abaxial epidermis) of the leaf has a conspicuous cuticle. The abaxial epidermis generally bears more stomata than the adaxial epidermis. The latter may even lack stomata. The tissue between the upper and the lower epidermis is called the mesophyll. Mesophyll, which possesses chloroplasts and carry out photosynthesis, is made up of parenchyma. It has two types of cells – the palisade parenchyma and the spongy parenchyma.

(NEW NCERT 11th Page No. 76)

134. (1)

If gynoecium is situated in the centre and other parts of the flower are located on the rim of the thalamus almost at the same level, it is called perigynous. The ovary here is said to be half inferior, e.g., plum, rose, peach. When a flower can be divided into two similar halves only in one particular vertical plane, it is zygomorphic, e.g., pea, gulmohur, bean, *Cassia*. The term syncarpous is a condition when carpels are fused, as in mustard and tomato. When stamens are attached to the petals, they are epipetalous as in brinjal, or epiphyllous when attached to the perianth as in the flowers of lily.

(NEW NCERT 11th Page No. 64, 65)

135. (3)

Schwann (1839), a British Zoologist, studied different types of animal cells and reported that cells had a thin outer layer which is today known as the 'plasma membrane'. He also concluded, based on his studies on plant tissues, that the presence of cell wall is a unique character of the plant cells.

(NEW NCERT 11th Page No. 88)

SECTION-B

136. (1)

In pteridophytes, the female gametophytes are retained on the parent sporophytes for variable periods. The development of the zygotes into young embryos take place within the female gametophytes. This event is a precursor to the seed habit considered an important step in evolution.

(NEW NCERT 11th Page No. 32)

137. (2)

Roots in some genera have fungal association in the form of mycorrhiza *(Pinus)*, while in some others *(Cycas)* small specialised roots called coralloid roots are associated with N_2- fixing cyanobacteria. The stems are unbranched (*Cycas*) or branched (*Pinus, Cedrus*).

(NEW NCERT 11th Page No. 32)

138. (3)

Sphagnum is a moss.

The pteridophytes are classified into four classes: Psilopsida (*Psilotum*); Lycopsida (*Selaginella, Lycopodium*), Sphenopsida (*Equisetum*) and Pteropsida (*Dryopteris, Pteris, Adiantum*).

(NEW NCERT 11th Page No. 30, 32)

139. (2)

The outer covering of endosperm separates the embryo by a proteinous layer called aleurone layer.

(NEW NCERT 11th Page No. 67)

140. (3)

(Type of aestivation)	(Example)
Sepals or petals in a whorl just touch one another at the margin, without overlapping.	*Calotropis*
The margins of sepals or petals overlap one another but not in any particular direction.	*Cassia*
Five petals, the largest (standard) overlaps the two lateral petals (wings) which in turn overlap the two smallest anterior petals (keel).	Bean

(NEW NCERT 11th Page No. 64)

141. (4)

When a flower can be divided into two equal radial halves in any radial plane passing through the centre, it is said to be actinomorphic, e.g., mustard, *Datura*, chilli.

Maize is a monocot plant.

(NEW NCERT 11th Page No. 62, 66)

142. (1)

Unlike bryophytes and pteridophytes, in gymnosperms the male and the female gametophytes do not have an independent free-living existence.

The predominant stage of the life cycle of a moss is the gametophyte which consists of two stages. The first stage is the protonema stage, which develops directly from a spore. It is a creeping, green, branched and frequently filamentous stage. The second stage is the leafy stage, which develops from the secondary protonema as a lateral bud.

(NEW NCERT 11th Page No. 30, 33)

143. (4)

Next to endodermis in root lies a few layers of thick-walled parenchymatous cells referred to as pericycle. Initiation of lateral roots and vascular cambium during the secondary growth takes place in these cells. The pith is small or inconspicuous. The parenchymatous cells which lie between the xylem and the phloem are called conjuctive tissue.

(NEW NCERT 11th Page No. 74)

144. (4)

The innermost layer of the cortex is called endodermis. It comprises a single layer of barrel shaped cells without any intercellular spaces. The tangential as well as radial walls of the endodermal cells have a deposition of water-impermeable, waxy material suberin in the form of casparian strips. Next to endodermis lies a few layers of thick-walled parenchymatous cells referred to as pericycle.

(NEW NCERT 11th Page No. 74)

145. (4)

The sub-metacentric chromosome has centromere slightly away from the middle of the chromosome resulting into one shorter arm and one longer arm. In case of acrocentric chromosome the centromere is situated close to its end forming one extremely short and one very long arm, whereas the telocentric chromosome has a terminal centromere.

(NEW NCERT 11th Page No. 101)

146. (2)

A virus is a nucleoprotein and the genetic material is infectious.

(NEW NCERT 11th Page No. 20)

147. (1)

Some cells in the adult animals do not appear to exhibit division (e.g., heart cells) and many other cells divide only occasionally, as needed to replace cells that have been lost because of injury or cell death. These cells that do not divide further exit G_1 phase to enter an inactive stage called quiescent stage (G_0) of the cell cycle. Cells in this stage remain metabolically active but no longer proliferate unless called on to do so depending on the requirement of the organism.

(NEW NCERT 11th Page No. 122)

148. (3)

Universal rules of nomenclature are as follows:

1. Biological names are generally in Latin and written in italics. They are Latinised or derived from Latin irrespective of their origin.
2. The first word in a biological name represents the genus while the second component denotes the specific epithet.
3. Both the words in a biological name, when handwritten, are separately underlined, or printed in italics to indicate their Latin origin.
4. The first word denoting the genus starts with a capital letter while the specific epithet starts with a small letter.

(NEW NCERT 11th Page No. 04)

149. (4)

The M Phase represents the phase when the actual cell division or mitosis occurs and the interphase represents the phase between two successive M phases. It is significant to note that in the 24 hour average duration of cell cycle of a human cell, cell division proper lasts for only about an hour. The interphase lasts more than 95% of the duration of cell cycle.

(NEW NCERT 11th Page No. 121)

150. (1)

Fusion between one large, nonmotile (static) female gamete and a smaller, motile male gamete is termed oogamous, e.g., *Volvox, Fucus.*

(NEW NCERT 11th Page No. 24)

(ZOOLOGY)

SECTION-A

151. (2)

Mammals, many terrestrial amphibians and marine fishes mainly excrete urea and are called ureotelic animals.

(NEW NCERT, Class11th, Page No.-205)

152. (1)

Increase in Ca^{++} level leads to the binding of calcium with a subunit of troponin on actin filaments and thereby remove the masking of active sites for myosin.

(NEW NCERT, Class11th, Page No.-222)

153. (3)

Blood is the medium of transport for O_2 and CO_2. About 97 per cent of O_2 is transported by RBCs in the blood. The remaining 3 per cent of O_2 is carried in a dissolved state through the plasma. Nearly 20-25 per cent of CO_2 is transported by RBCs whereas 70 per cent of it is carried as bicarbonate. About 7 per cent of CO_2 is carried in a dissolved state through plasma.

(NEW NCERT, Class11th, Page No.-189)

154. (3)

Myelin sheath is responsible for faster conduction of impulses through the nerve fibres. The impulses in the myelinated neurons jump from node to node in a transmission process called saltatory conduction. Thus, the myelination of axons increases the speed of action potential.

(NEW NCERT, Class11th, Page No.-232)

155. (3)

List-I	List-II
The process of secreting ammonia	Ammonotelism
Marine fishes	Ureotelic
Fresh water fishes	Ammonotelic
Land snails	Uricotelic

[New NCERT, Class11th, Page No.-205]

156. (2)

Each half of pectoral girdle consists of a clavicle and a scapula. Scapula is a large triangular flat bone situated in the dorsal part of the thorax between the second and the seventh ribs. The dorsal, flat, triangular body of scapula has a slightly elevated ridge called the spine which projects as a flat, expanded process called the acromion. The clavicle articulates with this. Below the acromion is a depression called the glenoid cavity which articulates with the head of the humerus to form the shoulder joint.

(NEW NCERT, Class11th, Page No.-226)

157. (3)

The first heart sound (lub) is associated with the closure of the tricuspid and bicuspid valves whereas the second heart sound (dub) is associated with the closure of the semilunar valves.

(NEW NCERT, Class11th, Page No.-200)

158. (4)

When a neuron is not conducting any impulse, i.e., resting, the axonal membrane is comparatively more permeable to potassium ions (K^+) and nearly impermeable to sodium ions (Na^+).

(NEW NCERT, Class11th, Page No.-232)

159. (1)

Cardiac muscle tissue is a contractile tissue present only in the heart. Cell junctions fuse the plasma membranes of cardiac muscle cells and make them stick together. Communication junctions (intercalated discs) in cardiac muscle at some fusion points allow the cells to contract as a unit, i.e., when one cell receives a signal to contract, its neighbours are also stimulated to contract.

(Old NCERT, Class11th, Page No.-105)

160. (4)

The efferent arteriole emerging from the glomerulus forms a fine capillary network around the renal tubule called the peritubular capillaries. A minute vessel of this network runs parallel to the Henle's loop forming a 'U' shaped vasa recta.

(NEW NCERT, Class11th, Page No.-208)

161. (3)

Muscle contains a red coloured oxygen storing pigment called myoglobin. Myoglobin content is high in some of the muscles which gives a reddish appearance. Such muscles are called the Red fibres. On the other hand, some of the muscles possess very less quantity of myoglobin and therefore, appear pale or whitish. These are the White fibres. Number of mitochondria are also few in them, but the amount of sarcoplasmic reticulum is high. They depend on anaerobic process for energy.

(NEW NCERT, Class11th, Page No.-223)

162. (2)

During inspiration diaphragm and external intercostal muscles contract which results increase in the thoracic volume and causes a similar increase in pulmonary volume. An increase in pulmonary volume decreases the intra-pulmonary pressure to less than the atmospheric pressure which forces the air from outside to move into the lungs, i.e., inspiration.

(NEW NCERT, Class11th, Page No.-185, 186)

163. (4)

When a stimulus is applied at a site on the polarised membrane, the membrane at that site becomes freely permeable to Na^+. This leads to a rapid influx of Na^+ followed by the reversal of the polarity at that site, i.e., the outer surface of the membrane becomes negatively charged and the inner side becomes positively charged. The polarity of the membrane at that particular site is thus reversed and hence depolarised. The electrical potential difference across the resting plasma membrane is called the resting potential.

(NEW NCERT, Class11th, Page No.-232-233)

164. (3)

Protonephridia or flame cells are the excretory structures in Platyhelminthes (Flatworms, e.g., *Planaria*), rotifers, some annelids and the cephalochordate – Amphioxus. Nephridia help to remove nitrogenous wastes and maintain a fluid and ionic balance.

(NEW NCERT, Class11th, Page No.-206)

165. (2)

Asbestosis, silicosis and Emphysema are example of respiratory disorders.

(NEW NCERT, Class11th, Page No.-191)

166. (3)

During shortening of the muscle, i.e., contraction, the 'I' bands get reduced, whereas the 'A' bands retain the length. The Z-lines come together, and so the sarcomere shortens as well. However, the A band does not change length during muscle contraction, since its length is the same as the length of the thick filaments.

(NEW NCERT, Class11th, Page No.-222)

167. (4)

	List-I		List-II
I	Depolarization phase in the generation of an action potential	A	opening and then closing of Na^+ channels
II	Repolarization phase in the generation of an action potential	B	opening of potassium gates and rushing of potassium
III	Absolute refracting phase	C	The sodium channel remained open
IV	Resting phase	D	All voltage gated sodium and potassium channels are closed

(NEW NCERT, Class11th, Page No.-232, 233)

168. (3)

Bones have a hard and non-pliable ground substance rich in calcium salts and collagen fibres which give bone its strength. Cells of cartilage are enclosed in small cavities within the matrix secreted by them.

(Old NCERT, Class11th, Page No.-104)

169. (4)

Conditional reabsorption of Na^+ and water takes place in the distal convoluted tubule.

(NEW NCERT, Class11th, Page No.-209)

170. (3)

The opening between the right atrium and the right ventricle is guarded by a valve formed of three muscular flaps or cusps, the tricuspid valve, whereas a bicuspid or mitral valve guards the opening between the left atrium and the left ventricle.

(NEW NCERT, Class11th, Page No.-198)

171. (3)

Loose connective tissue has cells and fibres loosely arranged in a semi-fluid ground substance, for example, areolar tissue present beneath the skin. Often it serves as a support framework for epithelium. It contains fibroblasts (cells that produce and secrete fibres), macrophages and mast cells. In the dense regular connective tissues, the collagen fibres are present in rows between many parallel bundles of fibres.

(Old NCERT, Class11th, Page No.-103)

172. (1)

First vertebra is the atlas and it articulates with the occipital condyles. The vertebral column is differentiated into cervical (7), thoracic (12), lumbar (5), sacral (1-fused) and coccygeal (1-fused) regions starting from the skull.

(NEW NCERT, Class11th, Page No.-225)

173. (1)

Another mass of nodal tissue is seen in the lower left corner of the right atrium close to the atrio-ventricular septum called the atrio-ventricular node (AVN). Right Atrioventricular valve is tricuspid valve whereas left atrioventricular valve is mitral or bicuspid valve.

(NEW NCERT, Class11th, Page No.-198, 199)

174. (1)

Blood group AB is universal acceptor. Blood group A contains antigen A and anti-B antibodies.

(NEW NCERT, Class11th, Page No.-195)

175. (4)

There are eight cranial bones i.e., parietal (2), temporal (2), frontal (1), occipital (1), ethmoid (1) and sphenoid (1). Zygomatic and lacrymal bones are the facial bones whereas Ischium is a bone of pelvic girdle.

(NEW NCERT, Class11th, Page No.-224)

176. (3)

Vasa recta are a series of straight capillaries in the medulla. They lie parallel to the loop of Henle. The Henle's loop and vasa recta play a significant role in producing concentrated urine.

(NEW NCERT, Class11th, Page No.-210-211)

177. (2)

The dorsal portion of the midbrain consists mainly of four round swellings (lobes) called corpora quadrigemina.

(NEW NCERT, Class11th, Page No.-236)

178. (4)

Dense irregular connective tissue has fibroblasts and many fibres (mostly collagen) that are oriented differently.

(Old NCERT, Class11th, Page No.-103)

179. (3)

Malfunctioning of kidneys can lead to accumulation of urea in blood, a condition called uremia, which is highly harmful and may lead to kidney failure. In such patients, urea can be removed by a process called hemodialysis.

(NEW NCERT, Class11th, Page No.-213)

180. (2)

Conceptual based question.

(NEW NCERT, Class11th, Page No.-227)

181. (3)

The hemispheres are connected by a tract of nerve fibres called corpus callosum. cerebral aqueduct is a part of midbrain.

(NEW NCERT, Class11th, Page No.-236)

182. (1)

A-IV, B-I, C-II, D-III

	List-I		**List-II**
A	Total lung capacity	I	5500 to 6000 mL
B	Inspiratory reserve volume	II	2500 mL to 3000 mL
C	Expiratory reserve volume	III	1000 mL to 1100 mL
D	Vital capacity	IV	4000 mL to 4500 mL

(NEW NCERT, Class11th, Page No.-186, 187)

183. (3)

Adipose tissue is another type of loose connective tissue located mainly beneath the skin. The cells of this tissue are specialised to store fats. The excess of nutrients which are not used immediately are converted into fats and are stored in this tissue.

(Old NCERT, Class11th, Page No.-103)

184. (3)

During the process of haemodialysis, the blood drained from a convenient artery is pumped into a dialysing unit called artificial kidney.

(NEW NCERT, Class11th, Page No.-213, 214)

185. (1)

Synovial joints are characterised by the presence of a fluid filled synovial cavity between the articulating surfaces of the two bones.

(NEW NCERT, Class11th, Page No.-227)

SECTION-B

186. (4)

The cerebrum wraps around a structure called thalamus, which is a major coordinating centre for sensory and motor signaling.

(NEW NCERT, Class11th, Page No.-236)

187. (2)

Reabsorption is minimum in its ascending limb. The descending limb of loop of Henle is permeable to water but almost impermeable to electrolytes. This concentrates the filtrate as it moves down. The ascending limb is impermeable to water but allows transport of electrolytes actively or passively. Therefore, as the concentrated filtrate pass upward, it gets diluted due to the passage of electrolytes to the medullary fluid.

(NEW NCERT, Class11th, Page No.-209)

188. (2)

White blood cells or leukocytes reduced in number because of a viral infection. WBCs are the major immune cells in our body which protects us from infections of various pathogens including viruses.

(NEW NCERT, Class11th, Page No.-194)

189. (3)

Each myosin (thick) filament is also a polymerized protein. Many monomeric proteins called Meromyosins constitute one thick filament. Each meromyosin has two important parts, a globular head with a short arm and a tail, the former being called the heavy meromyosin (HMM) and the latter, the light meromyosin (LMM). The HMM component, i.e.; the head and short arm projects outwards at regular distance and angle from each other from the surface of a polymerised myosin filament and is known as cross arm. The globular head is an active ATPase enzyme and has binding sites for ATP and active sites for actin.

(NEW NCERT, Class11th, Page No.-221)

190. (2)

Cerebrum forms the major part of the human brain. A deep cleft divides the cerebrum longitudinally into two halves, which are termed as the left and right cerebral hemispheres. The hemispheres are connected by a tract of nerve fibres called corpus callosum.

(NEW NCERT, Class11th, Page No.-236)

191. (2)

The kidneys have built-in mechanisms for the regulation of glomerular filtration rate. JGA is a special sensitive region formed by cellular modifications in the distal convoluted tubule and the afferent arteriole at the location of their contact.

(NEW NCERT, Class11th, Page No.-209)

192. (2)

Ans. (2)

The vertebral column is differentiated into cervical (7), thoracic (12), lumbar (5), sacral (1-fused) and coccygeal (1-fused) regions starting from the skull.

(NEW NCERT, Class11th, Page No.-225)

193. (3)

Statements (A), (B) and (C) are the main functions of cerebrum. The temporal lobe is associated with sense of taste, hearing and smell.

(NEW NCERT, Class11th, Page No.-236)

194. (1)

List-I	List-II
Medulla oblongata	Control rate of heart beat
Hypothalamus	Controls the pituitary
pons	Regulates respiration
Cerebrum	Controls vision and hearing

(NEW NCERT, Class11th, Page No.-236)

195. (1)

Pivot joint is present between atlas and axis which is a type of synovial joint.

(NEW NCERT, Class11th, Page No.-227)

196. (2)

In angina pectoris, symptom of acute chest pain appears when no enough oxygen is reaching the heart muscle. In a heart attack, the heart muscle is suddenly damaged by an inadequate blood supply.

(NEW NCERT, Class11th, Page No.-203)

197. (2)

The label X represents Node of Ranvier. It speeds up the impulse transmission.

(NEW NCERT, Class11th, Page No.-232)

198. (2)

A fall in glomerular blood flow/glomerular blood pressure/GFR can activate the JG cells to release renin which converts angiotensinogen in blood to angiotensin I and further to angiotensin II. Angiotensin II, being a powerful vasoconstrictor, increases the glomerular blood pressure and thereby GFR.

(NEW NCERT, Class11th, Page No.-212)

199. (1)

Expiratory Capacity (EC) is the total volume of air a person can expire after a normal inspiration. This includes tidal volume and expiratory reserve volume (TV+ERV).

(NEW NCERT, Class11th, Page No.-187)

200. (4)

Hyoid is a part of skull bones. Hyoid is a horse shoe shaped bone which supports tongue and provides insertion to some tongue muscle.

(NEW NCERT, Class 11th, Page No.-224)

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